On the nudibranch

Mention reefs and images of corals and fish usually pop up in your mind.

This is understandable given that corals are the building blocks of the reefs while fish are the most conspicuous residents. With more than 800 hard coral species and more than 4,000 species of fish, no wonder humans think mainly of fish and coral. Apart from fish and corals, do you know what else resides in your marine community?

The benthic marine community is monitored by the Pacific Island Network in four national parks. So throughout 2015 the PACN Quarterly will profile lesser known invertebrates that make up the marine benthic community in a segment called *Creatures from the Reef*. Although, we will barely scratch the surface. Coral reefs have 32 of the 34 recognized animal phyla. For comparison, tropical rainforests typically only have nine animal phyla. Think back to your high school biology days... a phylum is a principal taxonomic category that ranks below kingdom and above class. Moreover, scientists estimate there may even be another one to nine million undiscovered species of organisms living in and around coral reefs.

This quarter we are featuring nudibranchs or "sea slugs." Along with snails, octopuses, squid, and bivalves such as clams, nudibranchs belong in the Phylum Mollusca. Having shed their shell during the larval phase of development, nudibranchs come in a variety of shapes and sizes ranging from a small speck to 12 inches long. The name nudibranchs is derived from the Latin word for naked, *nudus* and the Greek word for gills, *brankia* in reference to the gill-like appendages sticking out on the backs of many species. Nudibranchs are usually divided into two main groups, dorids and aeolids. Dorids have a bronchial (gill) plume for respiration that is found in clusters on their back, around the anus. Aeolids have cerata (lateral outgrowths) for respiration that are spread across their back.

But with no shell for protection, how do they avoid being eaten? Their shocking array of bright colors serve to warn potential predators that they are toxic and it is best to stay away. Nudibranchs eat sponges, corals, hydroids, jellyfish, crustaceans, and even other nudibranchs. To find prey, nudibranchs use their highly sensitive tentacles called rhinophores found on top of their heads. The bright colors of nudibranchs come from the food they eat. Not only do some keep the colorful pigment of their food, some nudibranchs actually use other parts of their prey. After eating coral with algae, some nudibranchs can absorb the algae's chloroplasts (i.e. subcellular structure found in photosynthetic organisms) into their cerata where the nudibranch can then photosynthesize to make its own food. The nudibranchs that eat jellyfish will acquire their stinging cells (i.e. nematocysts), and actually place them in their cerata to be used for defense.

Nudibranchs are simultaneous hermaphrodites meaning each individual has a set of reproductive organs for both sexes. This evolved so that nudibranchs can maximize their reproductive output. Nudibranch eggs are embedded in a mucous matrix that both supports them and protects them. Dorids lay their eggs in flat ribbons usually attached to rocks, while aeolids lay their eggs in tangled masses attached to algae or other objects. The nudibranchs' lifespan ranges from less than a month to up to one year.

Hexabranchus aureomarginatus, a dorid nudibranch with its gill plume on the right.

There are over 3,000 species of nudibranchs in the ocean with an estimated 3,000 more yet to be discovered. So get out to your coral reef and look for some nudibranchs! Join us next newsletter for another equally compelling profile of an invertebrate marine benthic community member .

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